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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

09/682,899

10/31/2001

Melvin Robert Jackson

RD-27885

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6147

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05/07/2004

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
SCHENECTADY, NY 12301-0008

EXAMINER

MCALEENAN, JAMES M

ART UNIT

PAPER NUMBER

3745

DATE MAILED: 05/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/682,899

Applicant(s)

JACKSON ET AL.

Examiner

James M McAleenan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Applicant's response 2/20/2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-140 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 31, 32, 34-48, 64, 65, 67, 68, 70-78, 102-117, 133, 134, 136, 137, 139 and 140 is/are rejected.
- 7) ☒ Claim(s) 13-30, 33, 49-63, 66, 69, 79-101, 118-132, 135 and 138 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Applicant's response dated 2/20/2004 is acknowledged. Since the Office Action sent 11/18/2003 was an incomplete Office Action, the present Office Action (paper no. 11) will replace all prior actions resetting Applicant's response period.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-12, 28, 34-35, 37-39, 40, 43-47, 65, 67, 70-71, 73-74, 77-78, 102, 104-105, 107, 108, 109, 112-116, 133, 136, 139 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (U.S. Patent Number 5,738,491). Lee et al. discloses the method of repair of a gas turbine blade having a blade, wherein the blade has a tip and body (see Figures 4-7 and Col. 5, lines 3-46 and Col. 6, lines 1-60). Lee et al. teaches at least one tip insert disposed on the blade body, wherein the tip insert replaces a removed portion of the blade (see Figures 4-7 and Col. 5, lines 3-46). Regarding claim 2, Lee et al. teaches the blade tip including one squealer, at least one portion of the tip comprises at least one squealer (see Figures 4-7 and Col. 5, lines 3-46). Regarding claim 3, Lee et al. teaches joining at least one tip insert to the blade by means of a process of either welding, brazing and diffusion bonding (see Figures 4-7 and Col. 5, lines 3-46). Regarding claim

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4, Lee et al. discloses the tip insert including at least one internal cooling channel (see Figures 4-7 and Col. 5, lines 3-46). Regarding claim 6, Lee et al. the tip insert including a superalloy based on a metal selected from the group consisting of iron, cobalt and nickel (see Figures 4-7 and Col. 5, lines 3-46). Regarding claim 7, Lee et al. discloses the tip insert including a directionally solidified material. Regarding claim 8, Lee et al. teaches the tip insert including a single crystal material (see Figures 4-7 and Col. 5, lines 3-46 and Col. 6, lines 1-22). Regarding claim 10, Lee et al. teaches the blade having a first material and the tip insert having a second material. Lee et al. discloses the second material having at least one material property exceeding the first material, wherein at least one material property consists of oxidation resistance, creep life and fatigue life. Regarding claim 11, Lee et al. discloses the second material including a platinum group of metal modified nickel-based superalloy (see Figures 4-7 and Col. 6, lines 1-35). Regarding claim 28, Lee et al. teaches second material has a directionally solidified eutectic material. Regarding claim 34, Lee et al. teaches the blade being repaired by the method of repair of a gas turbine blade wherein the blade has a tip and body. Lee et al. teaches one tip insert disposed on the blade body, wherein the tip insert replaces a removed portion of the blade. Regarding claim 35, Lee et al. teaches method of manufacture of a gas turbine blade wherein the blade includes a tip and body (see Figures 4-7 and Col. 5, lines 3-46 and Col. 6, lines 22-60). Lee et al. discloses removing a portion of the blade tip and providing a tip insert, wherein the tip insert material includes a single nickel-based superalloy. Lee et al. discloses the second material including NiTaC directionally solidified eutectic alloy and an oxide dispersion strengthened alloy. Lee et al. discloses removing a portion of the blade tip and providing a tip insert, wherein

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the tip insert is disposed onto the blade body replacing the one removed portion of the blade. Regarding claim 37, Lee et al. teaches the method of manufacture of a gas turbine blade having a blade, wherein the blade has a tip and body. Lee et al. teaches at least one tip insert disposed on the blade body, wherein the tip insert replaces a removed portion of the blade tip. Regarding claim 38, Lee et al. teaches one tip insert including a squealer. Regarding claim 39, Lee et al. teaches joining at least one tip insert to the blade by means of a process of either welding, brazing and diffusion bonding. Regarding claim 40, Lee et al. discloses the tip insert including at least one internal cooling channel. Regarding claim 43, Lee et al. discloses the tip insert including a directionally solidified material. Regarding claim 44, Lee et al. teaches the tip insert including a single crystal material. Regarding claim 45, Lee et al. teaches the blade having a first material and the tip insert having a second material (see Figures 4-7 and Col. 5, lines 3-46 and Col. 6, lines 30-60). Lee et al. discloses each of a creep life, a fatigue life and an oxidation resistance for the first material being essentially equivalent to each of a creep life, a fatigue life and an oxidation resistance of the second material, respectively. Regarding claim 46, Lee et al. teaches the blade having a first material and the tip insert having a second material (see Figures 4-7 and Col. 6, lines 10-60). Lee et al. discloses the second material having at least one material property exceeding the first material, wherein at least one material property consists of oxidation resistance, creep life and fatigue life. Regarding claim 47, Lee et al. discloses the second material including a platinum group of metal modified nickel-based superalloy. Regarding claim 64, Lee et al. teaches second material having a directionally solidified eutectic material. Regarding claim 65, Lee et al. teaches the directionally solidified eutectic material being Ni, Ta, and C. Regarding claim 67, Lee et

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al. teaches the second material the second material includes an oxide dispersion strengthened material. Regarding claim 70, Lee et al. teaches the method of manufacture of a gas turbine blade having a blade, wherein the blade has a tip and body. Lee et al. teaches at least one tip insert disposed on the blade body, wherein the tip insert replaces a removed portion of the blade tip. Regarding claim 71, Lee et al. teaches the method of manufacture of a gas turbine blade having a blade, wherein the blade has a tip and body. Lee et al. teaches at least one tip insert disposed on the blade body, wherein the tip insert replaces a removed portion of the blade tip. Lee et al. teaches the tip insert comprising a material chosen from at least one of a single crystal nickel-based superalloy, a NiTaC directionally solidified eutectic alloy and an oxide dispersion strengthened alloy. Lee et al. teaches the tip insert is disposed on the blade body wherein the blade tip of the blade has a tip insert. Regarding claim 73, Lee et al. teaches a tip insert manufacture and repair of a tip for a gas turbine blade, wherein the tip includes an external surface shaped as a the external surface of a blade. Regarding claim 74, Lee et al. discloses the tip insert including at least one internal cooling channel. Regarding claim 77, Lee et al. discloses the tip insert including a directionally solidified material. Regarding claim 78, Lee et al. teaches the tip insert including a single crystal material. Regarding claim 102, Lee et al. teaches a tip insert for manufacture and repair of a tip of a gas turbine blade, wherein the insert includes an external surface substantially conforming for an external surface of the blade. Lee et al. teaches the tip insert being including a material of a single crystal nickel-based superalloy, a NiTaC directionally solidified eutectic alloy, and an oxide dispersion strengthened alloy. Regarding claim 104, Lee et al. teaches a gas turbine blade comprising of a turbine blade body and tip, wherein said blade tip comprises at

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least one tip insert joined to the blade body. Regarding claim 105, Lee et al. teaches the cross sectional thickness of the tip insert is less than a wall thickness of the blade body. Regarding claim 107, Lee et al. teaches the blade tip being a squealer. Regarding claim 108, Lee et al. teaches joining at least one tip insert to the blade by means of a process of either welding, brazing and diffusion bonding. Regarding claim 109, Lee et al. discloses the tip insert including at least one internal cooling channel. Regarding claim 112, Lee et al. discloses the tip insert including a directionally solidified material. Regarding claim 113, Lee et al. teaches the tip insert including a single crystal material. Regarding claim 114 Lee et al. teaches the blade having a first material and the tip insert having a second material. Lee et al. discloses the second material having at least one material property exceeding the first material, wherein at least one material property consists of oxidation resistance, creep life and fatigue life. Regarding claim 115, Lee et al. teaches the blade having a first material and the tip insert having a second material. Lee et al. discloses the second material having at least one material property exceeding the first material, wherein at least one material property consists of oxidation resistance, creep life and fatigue. Regarding claim 116, Lee et al. discloses the second material including a platinum group of metal modified nickel-based superalloy. Regarding claim 133, Lee et al. teaches second material has a directionally solidified eutectic material. Regarding claim 136, Lee et al. teaches the second material including an oxide dispersion strengthened material. Regarding claim 139, Lee et al. teaches a turbine blade body and tip, wherein the tip includes a tip insert joined to the blade body. Lee et al. discloses the tip insert being of a material from at least one of a single crystal nickel-based superalloy,

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a NiTaC directionally solidified eutectic alloy, and an oxide dispersion strengthened alloy material.

2. Claims 104, 106 are rejected under 35 U.S.C. 102(b) as being anticipated by Ferrigno et al. (U.S. Patent Number 5,846,057) (see Figure 6 and Col. 6, lines 8-63). Regarding claim 104, Ferrigno et al. teaches a gas turbine blade comprising of a turbine blade body and tip, wherein said blade tip comprises at least one tip insert joined to the blade body. Regarding claim 106, Ferrigno et al. teaches a cross sectional thickness of the tip insert is equal to a wall thickness of the blade body.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 41, 75, 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. Patent Number 5,738,491) (see Figures 4-7 and Col. 4, lines 1-45) in view of Lee et al. (U.S. Patent Number 5,348,446) (see Figure 3 and Col. 4, Lines 50-55). The Lee et al. device in the rejection of claims 1, 37, 73, 104 above, discloses all the claimed elements including the method of repair of a gas turbine blade having a blade, wherein the blade has a tip and body. Lee et al. teaches at least one tip insert disposed on the blade body, wherein the tip insert replaces a removed portion of the blade. However,

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the Lee et al. (U.S. Patent Number 5,738,491) device does not disclose (regarding claim 5) at least one tip insert comprising of a plurality of cooling holes. The Lee et al. (U.S. Patent Number 5,738,491) device does not disclose (regarding claim 41) at least one tip insert comprising of a plurality of cooling holes. The Lee et al. (U.S. Patent Number 5,738,491) device does not disclose (regarding claim 75) at least one tip insert comprising of a plurality of cooling holes. The Lee et al. (U.S. Patent Number 5,738,491) device does not disclose (regarding claim 110) at least one tip insert comprising of a plurality of cooling holes.

4. Claims 12, 31-32, 36, 42, 48, 68, 72, 76, 103, 117 are rejected under 35 U.S.C. 103(a) as being unpatentable Lee et al. (U.S. Patent Number 5,738,491) (see Figures 4-7 and Col. 4, lines 1-45 and Col. 5, lines 60-62) in view of Arnold (U.S. Patent Number 6,049,978) (see Col. 14, Lines 6-59). The Lee et al. device in the rejection of claims 1, 37, 73, 104 above, discloses all the claimed elements including (regarding claim 36) the method of manufacture of a gas turbine blade wherein the blade includes a tip and body. Lee et al. discloses removing a portion of the blade tip and providing a tip insert, wherein the tip insert is disposed onto the blade body replacing the one removed portion of the blade. The Lee et al. device teaches (Regarding claim 72) the method of manufacture of a gas turbine blade wherein the blade includes a tip and body. Lee et al. discloses removing a portion of the blade tip and providing a tip insert, wherein the tip insert is disposed onto the blade body replacing the one removed portion of the blade. The Lee et al. device teaches (Regarding claim 103) the method of manufacture of a gas turbine

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blade having a tip insert comprising an external surface conforming with an external surface of the blade. Regarding claim 140, Lee et al. teaches a turbine blade body and tip, wherein the tip includes a tip insert joined to the blade body material.

However, the Lee et al. device does not disclose (Regarding claim 12) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, Ir and Ru. The Lee et al. device does not disclose (Regarding claim 31) the second material the second material includes an oxide dispersion strengthened material. The Lee et al. device does not disclose (Regarding claim 32) the oxide dispersion strengthened material includes Ni, Cr and yttrium oxide. The Lee et al. device does not disclose (Regarding claim 36) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof. The Lee et al. device does not disclose (Regarding claim 42) the tip insert including a superalloy based on a metal selected from the group consisting of iron, cobalt and nickel. The Lee et al. device does not disclose (Regarding claim 48) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, Ir and Ru. The Lee et al. device does not disclose (Regarding claim 68) the oxide dispersion strengthened material includes Ni, Cr and yttrium oxide. The Lee et al. device does not disclose (Regarding claim 72) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof. The Lee et al. device does not disclose (Regarding claim 76) the tip insert including a superalloy based on a metal selected from the group consisting of iron, cobalt and nickel. The Lee et al. device does not disclose (Regarding claim 103) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof. The Lee et al. device does not disclose (Regarding claim 117) the tip insert including a superalloy based on a metal selected

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from the group consisting of iron, cobalt and nickel. The Lee et al. device does not disclose (Regarding claim 134) the directionally solidified eutectic material being Ni, Ta, and C. The Lee et al. device does not disclose (Regarding claim 137) the oxide dispersion strengthened material includes Ni, Cr and yttrium oxide. The Lee et al. device does not disclose (Regarding claim 140) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof.

However, Arnold (U.S. Patent Number 6,049,978) (see Col. 14, Lines 6-59) discloses (Regarding claim 12) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, Ir and Ru (see Col. 14, Lines 6-59). The Arnold device discloses (Regarding claim 31) the second material the second material includes an oxide dispersion strengthened material (see Col. 14, Lines 6-59). The Arnold device discloses (Regarding claim 32) the oxide dispersion strengthened material includes Ni, Cr and yttrium oxide (see Col. 14, Lines 6-59). The Arnold device discloses (Regarding claim 36) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh and mixtures thereof. The Arnold device discloses (Regarding claim 42) the tip insert including a superalloy based on a metal selected from the group consisting of iron, cobalt and nickel. The Arnold device discloses (Regarding claim 48) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, Ir and Ru. The Arnold device discloses (Regarding claim 68) the oxide dispersion strengthened material includes Ni, Cr and yttrium oxide. The Arnold device discloses (Regarding claim 72) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof. The Arnold device discloses (Regarding claim 76) the tip insert including a

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superalloy based on a metal selected from the group consisting of iron, cobalt and nickel. The Arnold device discloses (Regarding claim 103) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof. The Arnold device discloses (Regarding claim 117) the tip insert including a superalloy based on a metal selected from the group consisting of iron, cobalt and nickel. The Arnold device discloses (Regarding claim 134) the directionally solidified eutectic material being Ni, Ta, and C. The Arnold device discloses (Regarding claim 137) the oxide dispersion strengthened material includes Ni, Cr and yttrium oxide. The Arnold device discloses (Regarding claim 140) the super alloy comprising a metal selected from the group consisting of Pt, Pd, Rh, and mixtures thereof. It would have been obvious to one having ordinary skill in the art, at the time applicant's invention was made, to modify the Lee et al. device by incorporating the material of the super alloy as taught by Arnold, for the purpose of having material properties to withstand the extreme heat from the gases in the turbine engine to extend the fatigue life of the components as claimed by Applicant's claimed invention.

Allowable Subject Matter

5. Claims 13-27, 29-30, 33, 49-63, 66, 69, 79-101, 118-132, 135, 138 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Note, claim 13 has the novel features, since claims 14-27, 29 depend on claim 13 they have been included. Note, claim 49 has the novel features, since claims 50-63 depend on claim 49 they have been included. Note, claim 79 has the novel features, since

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claims 80-101 depend on claim 79 they have been included. Note, claim 118 has the novel features, since claims 119-132 depend on claim 118 they have been included.

PRIOR ART

6. The prior art made of record but not relied upon is considered pertinent to applicant's disclosure and consists of 12 patents.

A. Tip insert / tip cap similar to Applicant's claimed invention (6 patents):

Koffel et al. (U.S. Patent Number 4,411,597) discloses a tip insert as claimed by Applicant's claimed invention.

Eiswerth (U.S. Patent Number 4,411,597) discloses a tip insert or tip cap as claimed by Applicant's claimed invention.

Bowden, Jr. et al. (U.S. Patent Number 5,794,338) discloses a tip insert or tip cap similar to Applicant's claimed invention.

Crawmer et al. (U.S. Patent Number 5,351,395) discloses a method of as claimed by Applicant's claimed invention.

Schell et al. (U.S. Patent Number 5,584,663) discloses a tip insert as claimed by Applicant's claimed invention.

Ellis (U.S. Patent Number 4,118,147) discloses a tip insert as claimed by Applicant's claimed invention.

B. Materials similar to Applicant's claimed invention (6 patents):

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Ferrigno et al. (U.S. Patent Number 5,735,044) discloses a tip insert material as claimed by Applicant's claimed invention.

Jackson et al. (U.S. Patent Number 5,904,201) discloses a tip insert material as claimed by Applicant's claimed invention.

Dulaney et al. (U.S. Patent Number 6,238,187) discloses a tip insert material as claimed by Applicant's claimed invention.

Jackson et al. (U.S. Patent Number 5,778,960) discloses a tip insert material as claimed by Applicant's claimed invention.

Jackson et al. (U.S. Patent Number 5,673,745) discloses a tip insert material as claimed by Applicant's claimed invention.

Bewlay et al. (U.S. Patent Number 5,676,191) discloses a tip insert material as claimed by Applicant's claimed invention.

CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner James M. McAleenan whose telephone number is (703) 308-2827. The examiner can normally be reached on Monday thru Friday from 9:00 am to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached at 703-872-9306. The fax number for this Group is (703) 305-3588.

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An inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

J. M. McAl 4/2/04

James M. McAleenan
Patent Examiner
Art Unit 3745

E. K. Look
EDWARD K. LOOK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700
5/3/04